REMARKS/ARGUMENTS

Pending in this Application are Claims 1-20. Claims 1-4, 6, 7, 9, 10, 13, 15-20 are withdrawn. Claims 5, 8, 11, 12 and 14 are amended as provided herein. Claims 21-25 are newly added claims.

Formerly dependent, and currently independent claim 5, as amended, incorporates formerly independent, and now withdrawn Claim 1. Dependent claim 8 now depends on claim 5. New claims 21-24 depend on claim 5.

Formerly dependent, and currently independent claim 11, as amended, incorporates formerly independent, and now withdrawn Claim 9. Dependent claim 12 now depends on claim 11. Dependent claim 14 now depends on claim 11. New claim 25 depends on claim 11.

Claim Objections

The informalities cited by the Examiner in withdrawn Claims 1 and 9 have been corrected in amended claims 5 and 11, respectively. The informalities cited by the Examiner in Claims 11 and 12 have been corrected.

Claim Rejections – 35 USC Section 112

Examiner rejected Claims 1-20 in the Final Office Action under 35 USC Section 112, first paragraph, as failing to comply with the written description requirement.

As was discussed with the Examiner, in the specification, provisions of paragraphs [0007], [0008], [0009], [0010], [0011], [0015], [0024] and [0033] have been re-arranged and modified to better clarify the description of the operation of the invention. The original text utilized, in several

places the expression "different wavelengths of light" to present the case of a separate group of light quanta coming from the same light source (therefore having the same spectral power density or spectrum). Applicant had previously corrected this unclear language by using the expression "same wavelengths of light" in response to the First Office Action. Following Applicant's explanation of the description and operation of the invention, the Examiner suggested that Applicant revise the text to reflect the intended meaning for Examiner's further review. In response thereto, Applicant has struck the phrases "wavelengths of light", "selected wavelengths of light", and additional wavelengths of light" altogether and replaced them with the term "light" where the context required in the Specification and in the Claims.

Claim Rejections – 35 USC Section 102

In response to the Final Office Action, Applicant has withdrawn from consideration claims 1-4, 7, 9, 10, 13 and 15-20. Claim 6 has also been withdrawn as the subject matter thereof has been condensed into amended claim 5.

Claim Rejections – 35 USC Section 103

Examiner rejected Claims 5, 6, 8, 11, 12 and 14 under 35 USC 103(a) as being unpatentable over Shoda, US Patent No. 5,747,863 ("Shoda") in view of Kato et al. US Patent No. 3,617,753 ("Kato"). Applicant respectfully avers that, as amended, Claims 5, 6, 8, 11, 12 and 14, as well as new claims 21-25, overcome Examiner's rejection on the basis of Shoda in view of Kato.

Shoda is directed toward an infrared solid-state image pick-up device so as to identify non-visible objects by their temperature. In this manner, the device of Shoda operates as an infrared thermometer. The wavelengths of electromagnetic spectrum corresponding to specific temperatures from the object are converted into electronic signals operable to allow them to be displayed as a color image, not only based on the intensity of the infrared emission, but also on the temperature distribution of the object. The purpose of the arithmetic circuit in Shoda is to take signals from the sensors and obtain a set of ratios of the signals that are compared to a predetermined absolute temperature of a blackbody. This relationship allows the calculation of the temperature of the object independently of the value of the emissivity. Shoda uses two identical Schottky diodes (or more) and integrated interference filters of different thickness to create devices with different photo-responses and later manipulates these signals to cancel or enhance specific wavelength ranges, but the nature of the interference filters do not allows long wavelength cancellation as in the present invention. Shoda, in effect, describes an integrated embodiment of an otherwise fairly common apparatus using external filters and two sensors to create a pseudo-response. Furthermore Shoda does not teach how to cancel near-IR using the properties of silicon and silicon photo-diodes of dissimilar optical thickness. It is worth noting that the filter thickness in Shoda is not relevant to the optical thickness of the photo-diodes in the present invention as in Shoda's device the thickness between semi-transparent Pt plates defines the optical distance for generating peaks and valleys in the photo-response using interference while in the present invention the optical thickness of the silicon photo-diodes is used to define the thickness of a light absorbing material (silicon in the present case). This is in fact two very different physical properties leading to two very different results.

Kato discloses a circuit that uses planar transistors and MOS transistors to collect and output the red, blue and green information of light. Kato does not address the manipulation of the electronic information in any way so as to emphasize or attenuate one wavelength over another. While the invention of Kato captures red, blue and green light information and converts it to electronic signals, it also has unwanted responsiveness to other portions of the electromagnetic spectrum, such as infrared. Kato does not address this disadvantage by using a differential response.

Kato describes several ways of obtaining devices of 2um, 8um, and 20um of optical thickness but does not specify which way is best and for what reasons. In one embodiment of the present invention, the method used for obtaining the required optical thickness is optically sharp while being mechanically sound. The disclosure of the present invention also describes the consequences of variations in the optical thickness of the 3.5um and of the 7.0um devices to the output signal (pseudo-response). Disadvantageously, the devices of Kato are very fragile and some of said devices have optical thickness that those skilled in the art would recognize as having manufacturing control difficulties. The present invention uses buried-layers to define optically thin photo-diodes which are mechanically robust since they are not affected by the thickness of the silicon substrate and are easy to control in manufacturing since the optical thickness depends only on the subsequent epitaxial thickness.

More specifically, Kato describes the use of photo-sensors that are 2 micrometers and 8 micrometers "thick", whereas Shoda teaches how to use two photo-sensors and combine their photo-response to obtain a net or differential photo-response (pseudo-response in Shoda).

In contrast to both Kato and Shoda, in the present invention as claimed in the amended claims, the first and second electronic signals which derive from the light are manipulated to

generate a certain output signal. The coupling of photodiodes (12) and (14), with dissimilar optical thickness of about 7.0 micrometers and 3.5 micrometers creates a specific response differential canceling near infra-red. More specifically, as described in the Specification (See paragraph 0027), the present invention further comprises a circuit operable to multiply the first electronic signal by the ratio of the optical thicknesses of the second photodiode to the first photodiode to obtain a first product and thereafter the circuit is operable to subtract the second electronic signal from the first product, so as to obtain a reduced long wavelength response in the near infra-red and a resultant spectral response similar to a human eye. Such manipulation is directed toward the elimination of infrared information, a result that neither the Kato nor Shoda invention is directed to nor discusses.

Kato is operable to obtain red-green-blue output using sensors of different thicknesses (20um-8um-2um) for an RGB camera. Shoda uses interference filters using Pt layers and fairly thick dielectric) which require additional back-end processing such as post contact mask during fabrication to generate side by side devices with different responses. It is instructive and relevant to note that Shoda requires that the silicon must be transparent at the wavelengths of interest (Col. 10 line 36 Col. 11 line 46). Shoda explicitly states (Col. 11 line 13) that wavelength of less than 1um are not detected because they are absorbed by the substrate which are precisely the wavelengths of interest in the present invention application.

Applicant respectfully assets that it is highly unlikely that one would read Kato to suggest that it is possible to use diodes of 2 micrometers and 8 micrometers in an attempt to cancel near-IR light. The only way this would work is if the current from the 2 micrometer diode is multiplied by 4 and then the current from the 8 micrometer diode is subtracted. Such a suggestion is not present either in Kato or in Shoda. At long wavelengths the light absorbed by the 2 micrometer diode will

be about one fourth that of the 8 micrometer diode. The present invention, as described in the amended claims, describe a 3.5 micrometer and 7 micrometer diode to cancel near-IR. using a factor of 2, as this 2X factor is best for noise and manufacturing reasons. It is not possible to use a 2 micrometer diode and an 8 micrometer diode and a factor of 2 (i.e.: 2 X (2 micrometer diode current minus 8 micrometer diode current)) and cancel near-IR. Applicant respectfully submits that this teaching is neither present nor suggested in Kato or Shoda.

As noted above, there is no suggestion or incentive in either reference to combine these references. Even using hindsight and selective picking and choosing features of this prior art, Applicant respectfully submits that the combination of the references falls short of rendering obvious the claimed invention, as described in the amend claims.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully Submitted,

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